there is not known a single authentic case of the inheritance of acquired characters. The pamphlet contains in general the ideas noted above.

Die Thatsachen der Vererbung. ROTH. Berlin, 1885.

We have no opportunity to review the older theories of heredity, and simply refer those desiring abstracts of the more important to the above. The author intersperses critical notices of his own.

Ueber die Dauer des Lebens. WEISMANN. Jena, 1882.

A curious but interesting discussion has arisen between Weismann and Götte concerning the relation of reproductive and somatic cells to the length of life and the causes of death. The former calls attention to the fact that protozoa are essentially immortal. We have a continuous growth of protoplasm, and the multiplication of individuals is due to continuous self-division. Of course myriads of individuals are continuously destroyed, but this is not due to any inner principle of senescence, but to other accidents. In metazoa, however, we have, besides "catastrophic death," a "natural death," which is not original, but has been acquired for the good of the species. Natural selection has fixed the length of life for each species at just those limits that admit of the fullest amount of reproductive activity needed to maintain the species. Slow breeders are longest lived; this law is correlated with a second law that the fecundity of the species or the number of eggs or young produced is dependent in direct ratio upon the liability to their destruction before maturity is attained. Protozoa became metazoa by the products of division remaining in contact to form a colony or mass of cells, among which differentiation of labor was instituted and a certain proportion of the cells were modified to serve the reproductive cells. It was clearly of no use for any but reproductive cells to remain immortal, and hence the power to divide so as to pass less and less germinal plasma into the somatic cells was advantageous and was preserved by natural selection. Weismann also thinks that the somatic cells were impressed with power of limited production, those in long lived individuals having the power to produce a greater number of generations than in the short lived. This appears as a weak point in the theory, for it would be difficult to prove that what is called natural death is not in all cases due to inner catastrophic causes, usually the failure in proper functioning of some vital organ. The fact that tissues can indefinitely regenerate themselves shows that their cells, if they receive proper conditions of nutrition, are practically immortal.

Ueber den Ursprung des Todes. GÖTTE. Leipzig, 1883.

Weismann's paper called forth this by Götte. His thesis is, that death is in all cases fundamental, that protozoa even have to die. The organization of the protoplasm breaks up and is reconstituted in the process known as *rejuvenescence*, in which the unicellular being, after having secreted a case or cyst about itself, lies dormant for a time as if in sleep. In the formation of a colony the cells may be alike *(homoplastic)* or unlike *(heteroplastic)*. The metazoa all belong to the latter group. In the first group reproduction of the body-colony is accompanied by the dissolution of the units, each of which continues its life, and by self-division produces a new colony-individual. But the parent individual has ceased to exist. Is this to be termed death? If so, where is the corpse? The dissolution is to be considered as dependent on the fact that each of the cells undergoes *rejuvenescence*, that they may recontinue to divide, and in so doing produce the new individuals. Among the heteroplasts only the reproductive cells have the chance to form new individuals, but the colony, as in the lowest metazoa, (mezozoa=*orthonectida*, etc.,) breaks up during reproduction, and the few somatic cells

are left as a corpse. In many insects death accompanies reproduction; but in cases where the two phenomena are separated in time, Götte supposes such a separation to have been secondarily acquired. A corpse is a secondary affair and not a necessary adjunct to the process that produces the corpse, and which we ordinarily call death. The individual is not to be looked on alone as the sum of the activities of its constituent units, but rather as the *interrelations* which these units sustain. The same number of cells engaged in the same amount of physiological work may be so differently arranged in two cases as to constitute two very different individuals. *Death is the breaking up of the relations*, and the units may survive. Or, if as in the metazoa, many units depend for their life, on the integrity of the relations subsisting between the different parts of the whole, their organization, too, may be destroyed. Tissue death follows individual death as a secondary or accidental consequence.

We may illustrate Götte's idea by an analogy. Essentially, there is no difference in the idea of death as applied to biology, and as applied to the death of a literary society, when the members agree to disband, possibly to found new societies. If we could feel sure that the analogy is something more than a mere analogy, but at bottom is a universal principle of life, we could gain immensely by a mutual comparison between sociology and biology. There are many terms and ideas common to the two sciences, such as division of labor, development, atavism, colony, etc. Reproduction by self-division might be illustrated by the splitting of a tribe into two. Budding by the founding of a colony by emigration of individuals representing different trades needful in the new colony. Sexual reproduction by the emigration of a single couple, and the gradual *development* (embryology) of a colony, with the differentiation of labor, as the individuals increase in number. The individual in this illustration represents the gemmule. The integrity of the state does not depend on the number of persons, though the amount of its activity and wealth does. Similarly, in the cell, the gemmules may be of like nature and vary much in number. Here the illustration favors the view of Kölliker rather than of Weismann. Although the work of two persons may be different, they are essentially alike in characteristics, and the descendant of any person in a state, could found a similar state if forced to do so by emigration.

Ueber Leben und Tod. WEISMANN. Jena, 1883.

Götte's paper was attacked by Weismann as follows: First, there is no evidence favoring Götte's idea of rejuvenescence in the protozoa. Death can only ensue when cells no longer immortal are produced by ontogenetic development of the germ cells of metozoa. Nothing else deserves the name. Death accompanying reproduction is in all cases catastrophic and due to the strain. This sort of death cannot be inherited and so cannot be established by the action of natural selection. Development is the result of a peculiar method of reproduction (the sexual) that has been acquired because of its advantages. Death itself has been secondarily established as a further advantage. The species is still immortal so long as the germ cells are, and the soma or individual is a subordinate and temporary (cytic) affair, constructed by the germ cells.

We have dwelt on these questions because the interrelation of reproductive cells and body is the most vital in every question concerning sex and sexual functions. Weismann's idea that the whole body stands over against the reproductive organs as the equivalent of one reproductive cell, seems to explain the fact that the extirpation of the reproductive organs, does not destroy the integrity of the individual, or cause death as happens, when for instance, the excretory organs (kidneys) are extirpated. Still, no sharp line can be drawn here, for some